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THE EARLY RECOGNITION OF TUBERCULOSIS.

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THE EARLY RECOGNITION OF TUBERCULOSIS.¹

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WHILE the old charge, that tuberculosis is an incurable disease, can no longer be successfully maintained it will be readily admitted by every one, who has had much experience, that cures are the exception and fatalities the rule. Men who have been in practice for years will find, when they come to write down the names of patients cured, that the list is a disappointingly short one.

Tuberculosis is curable in direct ratio to the size of the deposit and the resisting power of the patient. In most cases the primary deposit is small and when it takes place the resisting power of the patient is fairly good, at least better than at any subsequent stage of the disease. Were the condition recognized at this time many cases might be cured, but in practice this is rarely done, usually the disease is not recognized until constitutional symptoms have set in, and then it is mostly incurable.

It should be born in mind that tuberculosis is a parasitic disease and consequently always and essentially a local disease. The irritating influence of the deposit and the absorption of the poisonous products of the bacilli will, of course, give rise to constitutional symptoms, and these symptoms are the most striking clinical features of the disease. It was their prominence which led to the theory, held in the profession for many years and held largely now, that tuberculosis is a constitutional disease.

Tubercle bacilli leave their host through broken-down tissue, usually, though wrongly, called pus, and, as far as we know, gain entrance into a new host through the same medium. The ordinary methods of entrance into a new host are by way of the digestive and respiratory tracts. At both of these gateways nature placed barriers, but not insurmountable ones. The stomach is the natural gateway for all palpable substances as the lungs are for gases. In the stomach disease germs are apt to be destroyed by the gastric fluid, and their entrance into the system through the lungs is obstructed by the con-

¹ Read before the Woodbury County Medical Society, July 27, 1893.



formation and construction of the respiratory tract. When the gastric juice of the stomach is rendered abnormal by a depressed nervous system or by any other cause, or when the disease germs taken in are very numerous, or when they are protected by indigestible food, food which cannot be penetrated by gastric juice, disease gains entrance through this part, when, in spite of the formation of the nose and throat and the obstruction of the hair in the nares, and the expulsive efforts of the lungs upon the slightest irritation of a palpable body, palpable bodies carrying disease germs do gain entrance into the bronchi and even into the bronchioles and succeed in remaining there until they are taken up and carried into the system by the lymphatic glands; then disease gains entrance through the lungs.

I am aware that in the views expressed here I am at variance with most writers, but my opinion is based upon clinical observations and I have as yet seen no evidence advanced, either clinical or experimental, to disprove my position. The stomach is probably the most frequent method of entrance of the tubercle bacilli into the system. The route is a very direct one, a person inhaling dried-up tubercular tissue is more apt to get it into his stomach than into his lungs because it is liable to be deposited in the pharynx and swallowed with the spittle or food. The bacilli are also frequently taken with food and drink by persons who live in close social relations with consumptives. The eating and drinking utensils of consumptives and in fact almost everything they handle, unless they are very cleanly, is liable to become smeared with wet tubercular tissue, and to prove a source of infection to others. Food handled by consumptives and tuberculous milk and meat are also sources of infection by way of the stomach. When the bacilli have run the gauntlet of the stomach they are taken up by the lacteals of the small intestines and are carried directly into the circulation by way of the thoracic duct, the vena cava, the right heart, the lungs, the left heart and thence through the aorta. It will thus be seen that all of the infected blood has to pass through the lungs before it reaches any other part of the body and this accounts for the primary seat of the disease being most frequently in the lungs. As the blood leaves the left heart the largest amount goes to the intra-cranial and intra-abdominal organs, and we find in practice that these are next in frequency the primary seat of the disease. It is a pretty well-established fact that any interference with the circulation of a part is a powerful determining factor in tubercle deposit. The bacilli as they are carried along in the blood are arrested in the arterioles where the circulation is not entirely free. This accounts for a great many otherwise inexplicable clinical phenomena in tuberculosis. It explains why the apices of the lungs are most frequently affected first, why we have

a primary deposit in the bones, the reproductive organs, the intestines, the peritoneum, the brain, in fact, why we can have it in any organ or tissue which has a blood supply. With many people who lead an inactive life the circulation in the apices of the lungs is always torpid, and those parts of the lungs are therefore an excellent nidus for the arrest and development of the tubercle bacilli. Persons who develop bone tuberculosis can nearly always give a history of injury to the bone affected. Where the reproductive organs are the seat of the disease we will invariably find a history of congestion, injury or abnormal action. In children in whom we are apt to have congestion of the intestinal tract from overfeeding and congestion of the membranes of the brain from teething we nearly always have the primary seat of tuberculosis in the one or other of these regions.

Whilst the stomach is the most frequent gate of entrance of the bacilli into the system it is certain that the respiratory tract is likewise a frequent gateway. Formerly I was under the impression that the bacilli rarely gained entrance through the lungs, but some recent clinical studies of my own and some experiments made in the Loomis' laboratory¹ have convinced me that in this I was wrong. When the bacilli are carried into the system by way of the lungs the route of entrance is, strange to say, rather a circuitous one, the mode of entrance of the bacillus tuberculosis into the system,² and the development of the disease is necessarily very slow and insidious. As already stated, nature has placed many barriers in the way of palpable bodies entering into the lungs. The construction of the nose, pharynx and bronchi are all of such a nature that they interfere with the progress of any but gaseous matters. We know, however, that palpable bodies can get into the bronchi in spite of every obstacle. Tubercle bacilli cannot live long without an envelopment of some kind. Their usual envelopment is broken-down tissue and it is while embedded in particles of this that they are carried into the bronchial tubes. When they have been carried into the lungs, unless they are ejected with mucus secreted by the bronchial mucous membrane, they are, together with the material in which they are imbedded, absorbed by the lymphatic system and carried into the lymphatic glands where they will find a nidus for development. In these cases the primary seat of tuberculosis is always in the bronchial lymphatic glands, and it may remain dormant here for years before it even sets up any clinical symptoms that attract attention. It is only after a gland breaks down and deposits take place in lung tissue that the disease is apt to be detected.

¹ See Researches of the Loomis' Laboratory of the Medical Department of the University of New York, Nos. 1 and 2.

² Times and Register, October 19, 1889.

In order to be able to recognize tuberculosis early it is necessary to bear in mind that the primary seat of the disease may occur in any organ or tissue which has a blood supply, and that the disease may exist without constitutional symptoms. Whenever a patient presents himself with any functional derangement, or with any deviation from the normal in any organ or tissue, one should, unless some other cause can be definitely made out, be on the look-out for tuberculosis.

The first place to look for the disease is, of course, the lungs, as that is the most frequent seat. In examining the lungs for tubercle one must not expect pronounced indications in the early stage. The two places in the lungs in which one will most frequently find the primary deposit are the apices and the bronchial glands. When the primary deposit takes place in the apices, if the deposit is quite small, both the clinical and physical symptoms will be very meagre. There may be scarcely any cough, and the physical signs of all except the extreme apices of the lungs will be normal. By carefully examining over and above the clavicle in front and along the upper border of the scapula behind, one will find such signs of deposit as may exist. A deposit, be it ever so small, is bound to impair the resonance and produce a prolonged expiratory sound. The first of these signs is always present, and can be detected by an acute and skillful ear, but the latter will be absent upon shallow respiration, and can only be heard upon an inspiration deep enough to fill the air-cells of the affected parts. A diagnosis under such circumstances can, of course, never be a positive one, for we may have some impairment of resonance and prolongation of respiratory murmur without having a tubercular deposit. Where these symptoms exist and there is any deviation from the normal condition of health, it ought to be assumed that there is tuberculosis for the purposes of treatment at least.

When the primary deposit takes place in the bronchial glands, as it probably does in all cases in which the disease gains entrance into the system through the respiratory tract, it is extremely difficult to make an early diagnosis. In such cases there is not apt to be any deviation from the normal health until a gland becomes badly inflamed and breaks down. The only symptoms which show themselves are slight persistent cough of rather a ringing character and impairment of resonance along the spinal column along the edge of the scapula. This impairment of resonance can always be found when carefully looked for. The cough can be distinguished by its ringing character, and is apt to be aggravated by the taking of food. Where a cough persists for a long time and the patient tells you that it always occurs after meals, you ought at least to examine for enlarged bronchial glands. As soon as expectoration occurs the sputa ought to be exam-

ined for tubercle bacilli, which will always be found as soon as broken-down tissue appears. These cases mostly run a rapid course after the breaking down of the gland, and frequently a very acute course. They are quite often overlooked and misunderstood by the physician until breaking down has taken place, and then they excite wonder because of their sudden onset and rapid development. It is these cases that have led observers to the erroneous theory that bronchitis may develop into tuberculosis. They have also proven a stumbling-block to many in the way of accepting the theory of contagion. The very fact that a person may carry a tuberculous bronchial gland for years without developing constitutional symptoms of tuberculosis removes many cases so far from their source of infection that the relation between the new and the old cases is overlooked.

In the respiratory tract the pleura is often the primary seat of tuberculosis. An old pleurisy is apt to prove an excellent medium for the development of the disease. Unfortunately there is no way of telling a tubercular pleurisy from an ordinary pleurisy in the early stages. The general condition of the patient will throw more light on the subject than anything else.

After the lungs the next place in which to look for the primary seat of tuberculosis is the intra-abdominal region. In this region we can have every organ and tissue primarily affected. Which of the organs and tissues in this region is most frequently the primary seat cannot be definitely determined from present data. I am myself under the impression that it lies between the peritoneum and the reproductive organs, and that the peritoneum is most frequently primarily affected in the male, and the reproductive organs in the female. My own clinical observations would at least indicate this. How frequently the reproductive organs in the female are the primary seat of tuberculosis is indicated by some recent researches of Dr. J. Witridge Williams, in which microscopic examination of tubes and ovaries removed in ovariectomies showed tubercle bacilli in a great many cases.¹ In few of these cases was there any evidence of tuberculosis during life. The peritoneum is also frequently the primary seat in females, as is evidenced by the experience of laparotomists, who frequently encounter it when they do not expect it. The vermiform appendix, the lymphatic glands of the intestines and the pelvis, the kidneys, the liver and the spleen may be the primary seat of the disease. Primary tuberculosis in the intra-abdominal region is indeed difficult to diagnose during its early stage. If the deposit is small, symptoms are apt to be so meagre that even the patient will not have his attention arrested. In primary

¹ *Tuberculosis of the Female Generative Organs*, J. W. Williams, Johns Hopkins Hospital Reports, Vol. III, Nos. 1, 2, 3.

tuberculosis of the reproductive organs in women we are apt to have the usual symptoms which go along with any affection of these organs, such as leucorrhea, backache, etc. Leucorrhea is popularly looked upon as a forerunner of consumption, and this idea has no doubt sprung from the observations of the masses for ages. Primary tuberculosis of the peritoneum can usually be diagnosed by such clinical symptoms as pain and dullness on percussion. It is, however, very apt to be overlooked or to be treated as a case of simple peritonitis. Tuberculosis of the lymphatic glands of the intestines and of the pelvis can sometimes be made out by palpation and by digital examination of the pelvis through the rectum and vagina. In the early stages there are scarcely any clinical symptoms, and in the later stages the diarrhea is so prominent that the case is apt to be mistaken for typhoid fever. It is these cases in which an acute tubercular inflammation of the lungs is apt to set in and which are apt to be returned as cases of typhoid pneumonia. Primary tuberculosis of the kidneys, liver and spleen is fortunately rare, and when it does occur is extremely difficult to make out. Examination of the urine has sometimes been the means of diagnosing tuberculosis of the kidneys by revealing tubercle bacilli.

After the intra-abdominal region we find tuberculosis most frequently located within the cranium as a primary deposit. In the cranium the meninges are most frequently affected, although there may be a deposit in the brain tissue. Primary deposit of tubercle within the cranium occurs at all times of life, but most frequently in childhood. This is probably due to the large amount of blood which goes to the brain in children, and also to the reflex irritation which is so readily set up in the brains of children. A very large proportion of the deaths which are returned as having been due to convulsions have really been due to tuberculosis. Primary tuberculosis in the cranium is necessarily difficult to diagnose until it has set up such disturbance as to make successful treatment impracticable. The earliest symptoms are probably headache and tardy action of the cerebral functions. The symptoms will, of course, differ according as the deposit is in this or that portion of the brain. When the tubercular deposit is in the brain substance, or the meningeal deposit is large enough to press upon the brain tissue there may be epileptic convulsions, which may continue at intervals for a long time without setting up any other symptoms. Closer observation may enable us some time in the future to lay down rules by which an early diagnosis can be made with some certainty.

Next in frequency to the intra-cranial region we find tuberculosis primarily deposited most frequently in the bones. This is known under various names, such as white swelling, hip disease, Pott's disease, cold abscess, etc. Any bone in the body can be affected, but the

disease is most frequently located in the vertebra and in the large bones. As a rule, tuberculosis of the bone is easily diagnosed, but when it occurs on the inner surface of the vertebra there may be considerable difficulty. Where the affected bone is accessible, tenderness and swelling may be relied upon as diagnostic points, and when the inner surface of the vertebræ are affected pain and loss of weight are the earliest reliable symptoms. Tuberculosis of the inner surface of the vertebræ in the advanced stage may very closely resemble typhoid fever, as there may be diarrhoea from extension of inflammation to the bowels.

Tuberculosis of the skin, usually called lupus, is quite a frequent disease. It may occur in any part of the body. It can easily be recognized by the low, lazy character of the inflammation and by its obstinacy. Where there is any doubt this may be cleared up by a microscopic examination of broken-down tissue. Lupus is always a disease of long standing and of slow progress, and in time is followed by a secondary deposit in the lungs or brain.

Tuberculosis of the joints quite frequently occurs as a primary disease. Any joint may be affected, but the larger joints are more apt to be the seat of disease. There is some danger of mistaking a tuberculous joint for rheumatism, but careful examination will always show the difference. Tuberculosis is usually confined to a single joint.

Primary tuberculosis of the perineum is of frequent occurrence. I have no doubt but that a fair percentage of anal fistulas are the result of broken-down tubercular deposit. Prior to the formation of the fistula the deposit is not apt to attract sufficient attention to bring it to the notice of a physician. A tuberculous fistula should be carefully diagnosed before operating, as careless cutting into a tuberculous tract may set up general tuberculosis. Where a diagnosis cannot be made otherwise it can be cleared up by examining the broken-down tissue under the microscope.

Primary tuberculosis of the ear occurs quite frequently. It may give rise to a running sore, when it may be diagnosed by a microscopic examination.

Primary tuberculosis of the pharynx and of the tonsils is comparatively rare, but occurs often enough to make it necessary to keep on the lookout for it. When it occurs in the pharynx it can be easily recognized by the little yellow buttery-like millet seed deposits which will be found studded over a somewhat anemic mucous membrane. In the tonsils it is more difficult to recognize. Chronically enlarged tonsils should always be treated with suspicion and when they have to be removed should be removed entire, as I know of at least one case

of removal of enlarged tonsils where there is reason to believe that acute tuberculosis followed.

Primary tuberculosis of the larynx is a very rare disease. When it occurs it can easily be recognized by the anemic appearance of the parts and the yellowish deposit. Sometimes, however, it is extremely difficult for even an expert to determine between a tubercular ulcer and an epithelioma, and then the microscope must be depended on for a diagnosis.

Tuberculosis as a primary disease may be located in any tissue or organ to which blood is supplied. It occurs with sufficient frequency in the reproductive organs of males and in the internal reproductive organs of females to warrant calling attention to. It occasionally occurs in the heart and pericardium. It may occur in the eye and eyelids, in the nose and around the finger nails. In all of these places a positive diagnosis can only be made after most careful study of the case, and in some instances only after microscopic examination of the broken-down tissue.

Under ordinary circumstances tuberculosis only takes place in a person whose system is below par. It is, therefore, well for the physician to always be on the lookout for it in any patient who is run down and who is complaining of bad health only in a general way. Considerable aid may be had from inquiries as to exposure to the disease. If a patient presents himself in a broken-down condition and gives a history of having been exposed to tuberculosis by living in the same house with it, or by being intimately associated with some one who has it, it is very important to examine every possible organ or tissue for a deposit and a careful search will be frequently rewarded with success in finding it. I have found it in such unexpected places as the eyelid, the little toe or the root of a finger nail. Wherever found it must be treated as a disease which will extend if permitted, and which always tends toward fatal termination.

